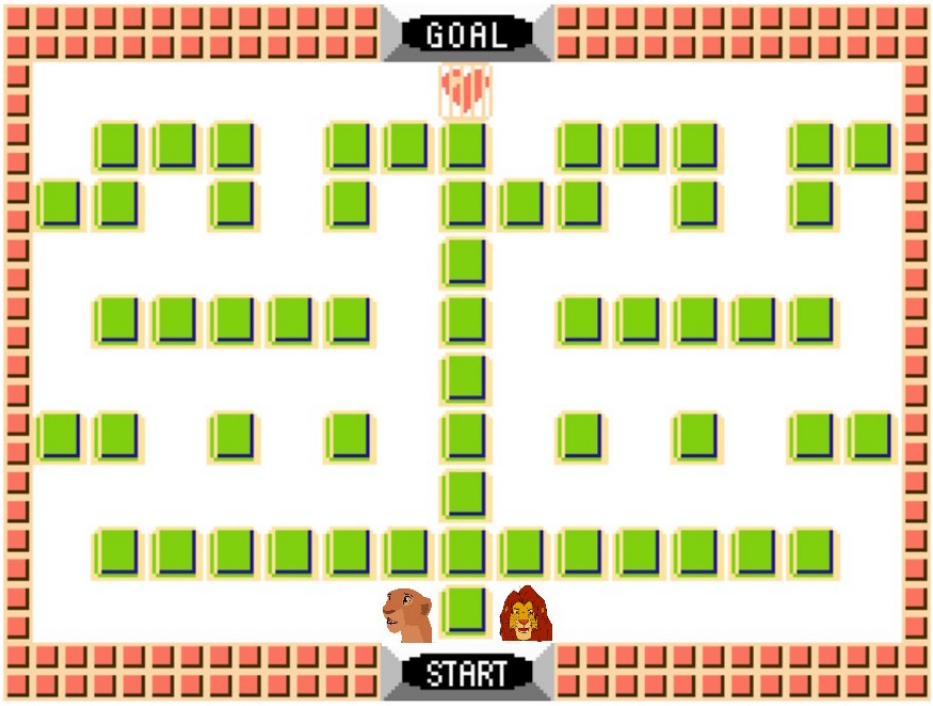
Lionland

Nala and Simba are a couple of lions living in Lionland, a marvelous country. They are trapped in a mystical maze, described as a grid with cells that are either free spaces or walls. Exactly one of the free spaces is designated as the *love cell*, having a nice heart inside a cage. Nala and Simba are initially located at two free spaces inside the maze.

The maze is surrounded by walls, so no lion can move outside it because, as everyone knows, lions cannot move through walls.



Nala (left) and Simba (right) trapped in the maze. North is upside and West is leftside.

Both lions can move freely through the free spaces, until they meet at the love cell, where they can fall in love together. At any given time, a lion can move from its current cell to an adjacent cell in one of four possible directions: north, south, east and west.

However, Nala and Simba were cursed by an evil witch! If a lion goes north or south, then the other must automatically go in the same direction; and, if a lion goes east or west, then the other must automatically go in the opposite direction. As it was mentioned before, no lion can move through a wall. Additionally, both lions can be in the same cell at any given time.

In detail, the curse works as follows:

- If a lion has a free cell to the north and it moves one step to the north, then the other lion must move one step to the north (at the same time). However, if the other lion has a wall to the north, it must stay in its current cell.

- If a lion has a free cell to the south and it moves one step to the south, then the other lion must move one step to the south (at the same time). However, if the other lion has a wall to the south, it must stay in its current cell.
- If a lion has a free cell to the west and it moves one step to the west, then the other lion must move one step to the east (at the same time). However, if the other lion has a wall to the east, it must stay in its current cell.
- If a lion has a free cell to the east and it moves one step to the east, then the other lion must move one step to the west (at the same time). However, if the other lion has a wall to the west, it must stay in its current cell.

Each cursed move of both lions takes exactly one unit of time. Given a maze, the coordinates of the love cell, and the initial coordinates of Nala and Simba, what is the minimum amount of time in which both lions can fall in love together?

Input

The input consists of several test cases. The first line of a test case contains two blank-separated integers, R and C, indicating, respectively, the number of rows and columns of the maze (without the surrounding walls). The second line contains six blank-separated integers, r_L, c_L, r_N, c_N, r_S, and c_S, indicating the coordinates (r_L, c_L) of the love cell, the initial coordinates (r_N, c_N) of Nala, and the initial coordinates (r_S, c_S) of Simba. Each of the next R lines contains C characters '`.`' or '`#`', where '`.`' represents a free space and '`#`' represents a wall.

You may assume that the coordinates (r_L, c_L), (r_N, c_N) and (r_S, c_S) correspond to free spaces, and that the given maze is surrounded by walls.

Constraints

$1 \leq R \leq 40$	Number of rows
$1 \leq C \leq 40$	Number of columns
$1 \leq r_L, r_N, r_S \leq R$	Row of the love cell and initial rows of Nala and Simba
$1 \leq c_L, c_N, c_S \leq C$	Column of the love cell and initial columns of Nala and Simba

Output

For each test case, output a single line with the minimum amount of time in which both lions can meet at the love cell or with the text '`NO LOVE`' if it is impossible for them to meet at the love cell.

Sample Input

```
10 15
1 8 10 7 10 9
...............
.###.###.###.##
##.#.#.###.#.#.
.......#.......
.#####.#.#####.
.......#.......
##.#.#.#.#.#.##
.......#.......
.#############.
.......#.......
3 3
1 2 3 2 3 2
...
.#.
...
3 3
1 2 3 2 3 2
...
###
...
3 3
3 2 3 2 3 2
...
###
...
```

Sample Output

```
31
4
NO LOVE
0
```